II. PHYSICAL FEATURES

A. GENERAL DESCRIPTION

The Fox River system is located in Alger, Schoolcraft and Luce counties in the eastern half of Michigan's Upper Peninsula. The mainstream of the Fox flows south from northeastern Alger County through flat sand plains and lowland hardwoods to its confluence with the Lake Branch of the Manistique River, which continues on the Lake Michigan. The Fox's East Branch, West Branch and Little Fox are its main tributaries. The East Branch joins the Fox River Mainstream about a mile above the Manistique River and is nearly equal to the Mainstream in length and discharge. The basin is approximately 26 miles long and 10 miles wide.

B. STREAM CHARACTERISTICS AND WATER QUALITY

The water quality of the Fox River is very good. No industrial uses, limited commercial timber harvest, and only a few homes exist along the river. No point sources discharge into the river. Stream bank vegetation is abundant, provides shade, and acts as a nutrient filter. Much of the river is considered top quality trout water. The river maintains high levels of dissolved oxygen, and cool temperatures during the summer (rarely above 68 degrees Fahrenheit). The water is soft, slightly alkaline, and low in nutrients, dissolved solids, and suspended solids.

Because of scattered raw banks and erosion, however, the river does carry an unusually high amount of sand of suspension. These particles cover gravel spawning areas, and interfere with respiration by fish and other aquatic organisms. The Fox River Mainstream is particularly vulnerable to erosion and sedimentation because of high, sandy banks and a lack of vegetation in certain areas. The close proximity of the Fox River Road to the Mainstream, and the recreational impacts that result from easy access, further increases the erosion potential along this section of stream.

The Fox River drains 270 square miles and drops 170 feet from the outfall of Casey Lake in Alger County to its confluence with the Lake Branch of the Manistique River. This is a drop of approximately five feet per mile. The average discharge at the confluence of the Manistique River is 180 cubic feet per second.

There are 158 miles of streams in the Fox River system. This includes the 35 mile long Mainstream. The table below lists the larger, named streams within the watershed.

FOX RIVER SYSTEM

Fox River Mainstream	35
Casey Creek	3
Pickerel Lake Outlet	3
Moose Lake Outlet	3
West Branch	9
Pelican Creek	1
Loon Creek	1
Grass Creek	2
West Branch Lakes Outlet	1
Spring Lake Outlet	1
Spring Pond Outlet	1
Little Fox	10
Hudson Creek	1
Two Mile Ditch	6
Gronden Creek	1
Dead Creek	2
East Branch Fox River	36
Carpenter Lake Outlet	1
Haymeadow Creek	3
Camp Seven Creek	3
Clear Creek	3
Snyder Creek	1
Deer Creek	6
Bev Creek	3
Cold Creek	5
Spring Creek	2
East Branch Slough	6
Various unnamed tributaries	9
TOTAL	158

1. Upper Fox Mainstream, West Branch, and Little Fox

   The Fox River originates in a semi-open marsh a quarter mile west of Deadman Lake in northeastern Alger County. As it flows downstream to its confluence with the West Branch, the stream courses through Casey Lake and through an area of lowland hardwoods and scattered swamp conifers. The stream bank is lined with an alder thicket.

   In this stretch the stream is small, with moderate to rapid flow and a sand/silt bottom with enough scattered gravel to provide adequate brook trout spawning habitat. The remains of an old logging dam are located about a half mile below the Moose Lake outlet. In the past, it provided water to float logs through this section, which is characterized by shallow swift rapids. Fishing pressure is light and success is fair for brook trout less than 11 inches.

Several lakes drain into the Fox in this section. The stream flows through Casey Lake; Defrost, Hemlock, Centerline and Moose lakes enter via the Moose Lake outlet; Pickerel, Second, Claypit and Porky lakes enter via the Pickerel Lake outlet. These lakes are part of the "Sunrise Landing Group" and are small, shallow, clear and acidic. Most contain simple warm water communities dominated by rough fish such as bullheads and suckers, with small populations of pike and perch. Dark Lake drains into the Fox about one mile below the Alger-Schoolcraft county line, and is reported to contain no fish.

Due to tannins from swampy areas, these waters are naturally low in productivity. Acid rain precipitation has further reduced the carrying capacity of these waters. The ability to sustain fish life in these lakes in the future is questionable due to the relatively low buffering capacity of their water.

Tributary streams, including Cold Creek (center), are the building blocks of the Fox River System.

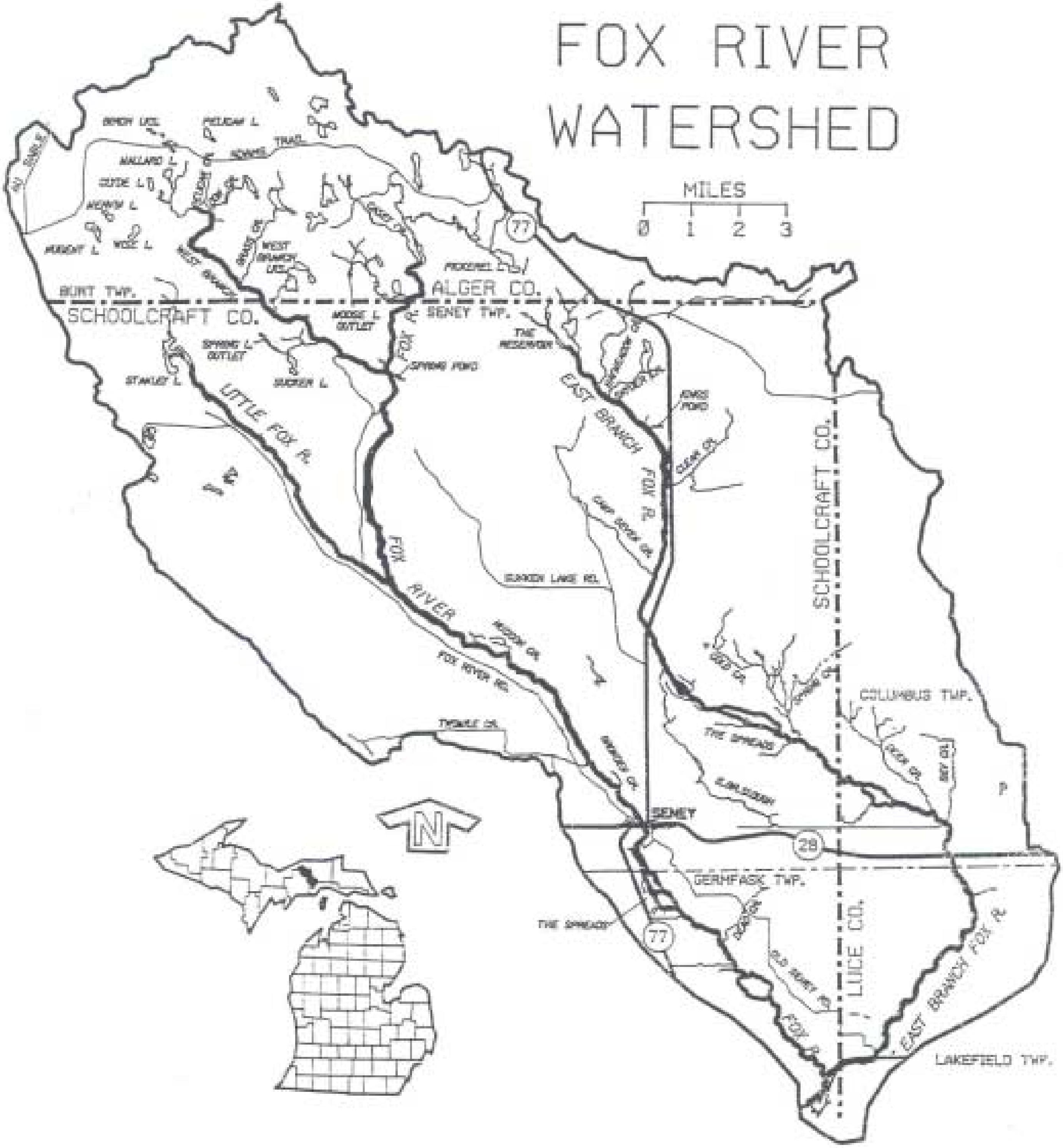
The headwaters of the West Branch include a semi-open marsh, a beaver pond, and Mallard Lake in eastern Alger County. This is flat sand plains country with the open Kingston Plains to the west and upland hardwoods to the east. The bottomlands are narrow and covered with lowland hardwoods and conifers. The stream has maximum width of about 30 feet and maximum depth of six feet. There is sufficient gravel spawning areas to sustain a good trout population. Taylor Dam site, an old logging dam, is located about 1 ½ miles upstream from the confluence with the Mainstream.

There are four tributaries to this stream: Pelican, Lon, Grass, and Spring creeks. The first three are classified second quality warmwater tributaries. Spring Creek is classified second quality trout water and provides good spawning and nursery habitat for brook trout.

Several lakes drain to the West Branch: Pelican, Pickerel, and Alger lakes via Grass Creek; and Spring and Sucker lakes via Spring Creek. These lakes are small, shallow, clear water

lakes containing small populations of yellow perch and northern pike. Access is poor resulting in little fishing pressure.

From the confluence of the West Branch, the Fox flows through one-half mile of northern hardwoods where flow is rapid over a gravelly bottom, then through four miles of flat sand plains, covered with grass and scattered red pine plantations, to its confluence with the Little Fox. The River valley is sandy loam covered by lowland hardwoods and conifers with a dense alder fringe along the stream. The stream here is about 30 feet wide and the maximum depth is about four feet. Cover in this area is fair and there is sufficient spawning habitat to maintain a healthy brook trout population.


FOX RIVER
WATERSHED
MILES
0 1 2 3
77
ALGER CO.
BURT TWP.
SCHOOLCRAFT CO.
SENEY TWP.
LITTLE FOX R.
FOX RIVER
FOX R.
EAST BRANCH FOX R.
SCHOOLCRAFT CO.
COLUMBUS TWP.
SENEY
28
GERMFASK TWP.
LUCE CO.
77
EAST BRANCH FOX R.
LAKEFIELD TWP.
N

Eight miles northwest of Seney the Mainstream is joined by the Little Fox River. This 10 mile long stream originates from springs above Stanley Lake and flows southeast through flat, sandy grass plains dotted with aspen, white birch and scattered red and jack pine plantations. A dense thicket of alders borders the stream. The stream ranges in width from 8 to 25 feet and up to 4 feet in depth. The stream supports a good brook trout population, but the dense alder thicket limits fishing.

There are four dam sites along the Little Fox: Stanley Lake Dam across the outlet of Stanley Lake was used as a logging reservoir control structure and has been replaced to maintain the Stanley Lake Flooding for waterfowl. A second dam was located about one mile below this to facilitate movement of logs through a flat marsh area. The debris of two other dams remain, and, as with the previous dams, were used by loggers as water storage devices. The remains of these structures provide good trout cover.

The Upper Fox River is narrow in many places with alders crowding the stream from both sides. Such vegetation provides valuable fish cover and leaf litter deposits.

The Fox River from the mouth of the Little Fox traverses eight sections of flat grassy sand plains with scattered red, jack and white pine stands. The bottomland is sandy loam with lowland conifers and alder along the stream's edge. The river in this segment is 30 to 40 feet wide and flows in a series of slicks and pools, with occasional riffles. It has a light brown color due to tannin from cedar swamp drainage. The bottom composition is 80 percent

sand, 5 percent silt, and 15 percent gravel below the Little Fox, but becomes 98 percent sand and 2 percent gravel just above Seney. Cover is good and includes deep pools, dead falls, log jams, overhanging brush and stream improvement structures. This portion of the stream receives moderate fishing pressure with good success. Fish range in size up to 2.5 pounds.

There are three tributaries entering the Fox River between the Little Fox and Seney: Hudson Creek, Two Mile Ditch, and Gronden Creek. Hudson and Gronden creeks are classified as second quality trout tributaries. No recent survey work has been done on these two streams. Two Mile Ditch normally flows into Clark Ditch, but there is an old stream bed that functions as an overflow during spring runoff.

2. Lower Fox

There is an abrupt change in the River below Seney. The river splits here to form The Spreads. This area is made up of many small shallow channels flowing through cattail, sweetgale and other marsh vegetation.

The Lower Fox River has a slow current and a high amount of turbidity.

Below The Spreads the river is clear and brown and flows at a leisurely pace. Sand/sedimentation problems are now obvious. Instream cover is sparse due to the sediment deposition and shifting which has buried most instream trout cover. Because of the bottom type, very little, if any, good brook trout spawning, cover, or nursery habitat is available. The river is classified second

quality warmwater mainstream below Dead Creek, and lowland hardwoods predominate.

Two tributaries enter below M-28. Both Dead Creek and Townline Ditch are small dark streams (draining low swamp areas), and are classified as second quality warmwater.

3. East Branch

The East Branch begins in a series of small spring fed lakes just west of M-77 near the Alger-Schoolcraft county line. These include Carpenter Lake, Mud Lake, and The Reservoir. The river flows south about 6.5 miles before it swings southeast and crosses M-77. The land in the first two miles of river is flat sandy loam covered with northern hardwoods. The remainder of its course is through sand plains with scattered stands of jack and red pine, plus aspen and white birch. The river bottom is sandy loam with swamp conifers and a thicket of alder along the stream.

The stream in this area is from 10 to 30 feet wide, has a maximum depth of 8 feet and the bottom is sand (80 percent), gravel/rubble (19 percent) and silt (1 percent). The water is clear and nearly colorless, flowing along in a series of riffles and slicks until it meets Clear Creek. From there it flows in a series of slicks and pools. It is classified as a second quality trout tributary until its confluence with Haymeadow Creek and then top quality trout water.

Haymeadow, Snyder, Clear, and Camp Seven creeks empty into the East Branch in this segment. All are second quality trout tributaries—small, shallow, clear water, sand bottom streams. All four receive light fishing pressure, producing fair catches of small brook trout.

There are several small lakes and ponds associated with this stream. The Reservoir is the site of an old logging dam. A pond that once covered about 60 acres now resembles an old beaver meadow, and brook trout, which once produced an exciting fishery, are now confined to the deeper holes of the nearly cut stream channel.

Forty-seven acre Carpenter Lake, in Section 6, is just north of the Reservoir. It is less than 30 feet deep, the water is light brown in color and it supports a small population of northern pike and yellow perch. This lake is completely encompassed by private land.

Haymeadow Pond is a four-acre, shallow (4-5 feet), clear spring pond at the head of Haymeadow Creek. It contains a small population of brook trout and produces some occasional nice catches.

Snyder Lake, a 63-acre body of water, is the largest drained by the East Branch. As with the rest of these lakes, it is shallow, clear and contains yellow perch and northern pike. There are several large boiling springs in the

north central part of the lake that keeps it clear and cool. Fishing pressure is light and success is fair.

At the East Branch Fox River Forest Campground is Kings Pond, a six-acre impoundment once used as a rearing pond by the state. This pond has a series of springs at its head that supply it with cold clear water, making it ideal for trout production.

The former site of Clear Pond is located at the headwaters of Clear Creek and at the site of an old beaver dam. Due to the relatively high cost of reconstruction and low fishery benefits generated by the former three-acre pond, the site was abandoned as a managed trout pond in 1984. Current plans call for the removal of the present structure and return to the original stream flow.

The East Branch changes abruptly below M-77. Just below the bridge it flows from a grassy sand plain into a sandy loam cattail bog. The stream below the bridge is a series of slicks and pools, but in the The Spreads it splits briefly into several broad shallow sandy channels which unite at the mouth of Cold Creek. The stream then continues south to M-28, a distance of about 14 miles.

The Spreads areas on both the Mainstream and East Branch are composed of numerous braided channels.

Cold Creek, along with its tributary Spring Creek, Deer Creek, Bev Creek, and East Branch Sough all enter the river in this segment. Cold and Spring

creeks are top quality trout and the remainder are second quality trout tributaries. All provide spawning and nursery habitat for brook trout. Fishing, except for beaver dams, is restricted to their mouths at the East Branch.

From M-28 downstream to its confluence with the Fox River, the East Branch flows through a muck cattail bog with patches of high sandy loam covered with spruce and fir. The stream bottom is sand and hardpan. The water is darker here and the river has slowed to glassy smooth. The river from the Soo Line Railroad Bridge downstream is classified second quality warmwater containing pike, perch, burbot, white suckers and associated minnows.

C. FISHERY

Historically, the Fox River has been known for its excellent brook trout fishing. The upper portions of the Fox, which includes the Mainstream above Seney and the East Branch above M-28, are prime trout waters. The stream bottom is primarily sand and silt, but contains enough scattered gravel to provide adequate brook trout spawning habitat. The brook trout fishery in the East Branch is probably the best in the system, but brown trout are starting to replace the brookies, which are the preferred fish of most local anglers. Brown trout now comprise about 50 percent of the trout population in the upper East Branch.

In addition to brook trout, the stream supports scattered populations of brown trout, yellow perch, and rock bass. Forage fish include sculpins, darters, dace, shiners, chubs, and mud-minnows. Course fish include burbot, eastern brook lamprey, white suckers and brown bullheads. Invertebrate food organisms include caddisfly, stonefly, mayfly, cranefly, and crayfish.

Most lakes in the upper watershed are small and shallow, and contain small populations of pike and perch. White suckers and bullheads are common, with the latter dominating many of these lakes. Access is poor, resulting in little fishing pressure. One notable exception is Kings Pond. Managed for brook trout, this pond has docks extending out into the water to make access easier for those without a boat or waders. It occasionally produces catches of 8-12” trout.

Fishing pressure on the upper Fox is generally light and success fair to good. Wading is not difficult except for some of the deeper pools on the Mainstream. Both live bait and artificial flies are used with success.

Fishing pressure on the East Branch below M-77 is heavy, probably the heaviest in this system. Excellent catches of brook trout up to two pounds, along with an occasional brown trout, are taken. The best fishing is obtained by parking on the west side of the M-18 bridge, motoring a small boat upstream to the Spreads and then fishing the holes and undercuts back down to the Soo Line Railroad Bridge. The stream reach in Luce County is currently managed as a no wake zone for motors.

In this segment, there's a strong population of brook trout and brown trout. There are also yellow perch, burbot, white suckers, eastern brook lamprey, and the usual assortment of minnows. Cover is good, consisting of improvement structures, log jams, undercuts and deep holes.

There is an abrupt change in the Mainstream and East Branch below M-28, and a corresponding change in the fishery. Both streams are now wider and have a leisurely flow to the confluence with the Manistique River. Instream cover consists of an abundance of windfalls, log hams, undercut banks, overhanging brush, and deep pools. Because of the bottom type, however, very little brook trout spawning habitat is available. Fishing pressure is light producing a few pike, walleye, and perch.

The East Branch below M-28 and the Mainstream below the Spreads are classified as second quality warmwater streams. Northern pike, yellow perch, burbot and white suckers are the predominant species. Food organisms are in moderate supply and consist of sculpins, sucker fry, mayfly, caddis nymphs, and lamprey ammocetes. Access to the river is difficult due to the swampy conditions, thus fishing pressure is generally very light.

Prior to 1964, the entire Fox System was stocked with legal brook trout. Every tributary with a road to it, plus many of the small lakes and ponds, were stocked. However, because surveys of so many of these streams indicated large populations of small fish, the "put and take" fishery was discontinued. All of these waters were dropped from the stocking schedule. Except for the Mainstream and portions of the upper East Branch, where sediment problems occur, natural reproduction is sufficient to maintain good populations of brook trout. Today only Kings Pond, Spring Creek Pond, and the Mainstream Fox above the confluence with the Little Fox, are being stocked. The ponds are under single species management for brook trout and stocked annually with fall fingerlings.

Portions of The Spreads contain one major channel and several small ones. . .

Extensive stream improvement work was done from 1947 to 1953 by the Department of Conservation (DNR) under the old Lake and Stream Improvement Program. Work was done on the upper Mainstream, upper East Branch, West Branch, and Little Fox. Earlier work was also done by the Civilian Conservation Corps in the Middle and late 1903s. The list of activities included placement of wing deflectors, log deflectors, digger logs, stump covers, and sodden log covers, plus riprapping, seeding, or sodding banks, planting willows, and constructing rush mat bank covers.

. . . while other stretches of The Spreads contain no large channel, only numerous smaller ones generally parallel to each other.

Another stream improvement initiative was begun in 1972. Work began on the Little Fox River above the "Spring" in May 1972 and continued through 1978. Work on the East Branch, just below the campground to the mouth of Camp Seven Creek, was done in 1973-74 and 1982-84. Work here included tag alder removal to facilitate better fishing and improve bank cover, placement of new structures, replacement of old structures, camouflaging of sound existing structures, and placement of half logs. This work was done to improve trout habitat.

Fisheries Division (DNR) constructed three sediment traps in the East Branch during November 1987. These were placed as follows: (1) at the lower end of the The Reservoir; (2) 1.2 miles below Clear Creek; and (3) just upstream of M-77. Sediment removed through the maintenance of these traps should improve the trout fisheries downstream of these areas.

D. PHYSICAL GEOGRAPHY

The geology of Michigan, including the Fox River watershed, was formed over a vast period of time. The more recent advance and recession of glaciers, however, have done the most to shape the watershed. Land forms in the watershed that have resulted from such glaciation include outwash deposits (stratified deposits of sand and gravel), lacustrine plains (fine sediments deposited on former lakebeds), and moraines (hills formed by the deposition of unsorted debris at the margins of the ice).

The general topography of the Fox River basin is flat, with swampy plains interspersed with hummocks and ridges of dry sand. The upper watershed contains numerous lakes that feed into the Fox. This area had more upland and relief than the lower watershed, and soil that is sandy and acidic.

The lower watershed is mostly wetland, with large pockets of marshy and swampy areas. The terrain is generally level with several notable exceptions such as the Blue Mountains, which rise about 80-100' above the level of the surrounding land. The soil is sand, sandy loam, peat, muck, local hardpan, and is strongly acidic. Much of the area is a former lake bed plain, with post-glacial accumulations. Access to the River in this region is very limited, and it is doubtful that the lands in private ownership could be developed or used for anything except limited timber harvesting.

Maximum elevation above sea level is about 1100 feet at one spot in the northern end of the watershed and the minimum elevation is 690 feet at the confluence with the Lake Branch of the Manistique River.

The Fox River basin lies between 46 and 47 degrees north latitude. Mean daily temperatures for July are a high of 75° F and a low of 52° F. January high and low daily temperatures average 24° F and 8° F, respectively.

Climatic features include mean annual precipitation (including melted snow) of about 30 inches, an annual snowfall of about 120 inches, high relative humidity and low evaporation. The growing season averages 120 days. Summers are moderately sunny, winters generally overcast. Considerable precipitation is stored as snow during the winter, which results in heavy spring runoff. Much of this runoff is stored in the bogs and marshes of the lower Mainstream, and following years of heavy snow, the Fox releases large amounts of water in a short time that causes a reversal of flow of the Lake Branch of the Manistique River and contributes to flood conditions on Manistique Lake.

E. VEGETATION

The Fox and its tributaries flow through a variety of forest cover types. Much of the area was extensively logged during the late 19th and early 20th centuries, and the resulting slash burned in the fires common during this period.

The upper Fox flows through northern hardwoods mixed with swamp conifers. Downstream from the confluence with the West Branch the surrounding lands are mainly burned over flat sand plains—some of which have been planted in red and jack pine. The immediate river valley is characterized by swamp conifers and the stream is fringed by a thick alder thicket. The East Branch is similar in character until reaching The Spreads. Occasionally, large red and white pines can be seen.

The Mainstream below Seney and the East Branch from The Spreads downstream flow through marsh, swamp, and bog areas. Vegetation along The Spreads of both the Mainstream and East Branch includes grasses, sedges, cattail, sweetgale, and alder. Woody vegetation downstream from these areas includes soft maple (mainly silver), ash, elm, and bogs of tamarack and spruce. Several pockets of upland contain pine, spruce and fir.

Presettlement forest included beech, maple, yellow birch, hemlock, and balsam fir on loamy upland areas. Pine, black spruce and white cedar could be found on sandy or low sites.

A small tract of land in the western portion of the watershed near Two-Mile Creek is considered a unique area by the Michigan Natural Features Inventory. Because of good vegetative reproduction, this second growth forest of white pine, red pine, and red maple is an excellent representation of presettlement forests for dry, sandy acidic soils.

1. Threatened and Endangered Species. Although the Fox River watershed has not been thoroughly surveyed, at least one legally protected plant species is found here. Alga pondweed (Potamogeton confervoides) is known to exist in the upper tributaries to the Mainstream. Fir clubmoss (Lycopodium selago), in the lower watershed is of special concern because of declining or very small populations.

F. WILDLIFE

The upper portions of the watershed are burned over sand plains and areas of sparse second growth which provide good summer range for whitetail deer. The river bottoms provide travel ways for the whitetail, but overbrowsing has reduced the wintering areas along most of the Fox River system. The East Branch flows through a deer wintering area from The Spreads to about six miles below M-28. The Spring Creek watershed is also important for wintering deer. Although food supplies have been greatly reduced in this area, deer move in during early winter to avoid the heavy snows to the north.

The watershed contains a good population of black bear, fox, coyote, bobcat, and snowshoe hare. Mammals such as otter, beaver, mink and muskrat are common. Trapping produces fair to good catches of beaver, otter and mink. A few muskrats are trapped in the marshy areas below Seney and at Stanley Lake.

The river bottoms provide important habitat for ruffed grouse and woodcock. Although the population of these game birds fluctuate from year to year, they provide good sport for the hunter. There are also sharptail grouse areas between the Fox and Driggs rivers and along the Taylor Dam Road. Populations of this game bird are low as the grassy openings in its habitat are gradually being replaced by brush and trees.

The river and adjacent marshes produce moderate numbers of waterfowl, particularly in the lower stretches. The crooked water course makes it a fairly good stream to float for waterfowl hunting. Ducks and geese from the Seney National Wildlife Refuge frequently use the river.

The Upper Fox Mainstream has numerous high sandy banks. Erosion from these areas covers gravel spawning sites and suffocates aquatic organisms.

Many other animals are commonly found along the Fox River. Songbirds include those that inhabit both boreal and deciduous forests. White-throated sparrow, nuthatch, black-capped chickadee, and woodpeckers are all common. Birds of prey include the red-tailed and broad-winged hawk, and the barred owl.

Various reptiles and amphibians can be found in the watershed. Reptiles include the snapping turtle, painted turtle, green snake, northern water snake and garter snake. Amphibians such as the leopard frog, gray tree frog, and wood frog are also common. Sandhill cranes are relatively abundant, and their distinct call can be heard throughout the area.

Moose were reintroduced to the western Upper Peninsula several years ago. This herd has since expanded, and these large animals are occasionally seen in the Fox River area. The DNR also has plans to reintroduce fishers in the future.

1. Threatened and Endangered Species

   Animals found in the watershed that are legally protected in Michigan include the common loon, bald eagle, osprey, pine marten, and loggerhead shrike. Wolves have been reported in the area, and although sightings have been reported by reliable sources, these are unconfirmed.